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## PROVED DAIRY SIRES

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Cow-testing-association records are now being used to prove dairy sires as well as to test cows for economical production. A sire is considered proved when the production records of five or more of his unselected daughters have been compared with the production records of their dams. In all cases the records of immature cows are figured to maturity before comparisons are made.

**THE INFLUENCE OF DAIRY SIRES ON THE PRODUCTION OF THEIR DAUGHTERS**

Up to June 1, 1927, only 270 sires had been proved by means of cow-testing-association records. However, a much larger number of sires had been partially proved through a comparison of the records of a smaller number of daughters with the records of their dams. The total number of records of daughters of all the cow-testing-association sires was 5,217. Table 1 compares the records of these daughters with the records of their dams.

TABLE 1.—*Comparison of production records of daughters and dams*

Number of records	Average production	
	Milk	Butterfat
Daughters, 5,217.....		
Dams, 5,217.....		
Daughters' gain, pounds.....	Pounds 9,127	Pounds 370
Daughters' gain, per cent.....	8,787	352
	340	18
	3.9	5.1

This is a comparatively small gain, whether it be considered in pounds of milk and butterfat or in percentages of milk and butterfat. A gain of 3.9 per cent in milk production and of 5.1 per cent in production of butterfat is gradually building up our dairy herds. They

might be improved much more rapidly, however, if intelligently selected proved sires were used in every dairy herd. In Table 2 the records of the daughters of 250 proved sires are compared with the records of the dams of the daughters.

TABLE 2.—*Comparison of production records of the daughters of proved bulls with the records of the dams of the daughters*

Number of records	Average production	
	Milk	Butterfat
Daughters, 1,633	Pounds	Pounds
	9,376	391
Dams, 1,633		8,748
		353
Daughters' gain, pounds	628	38
Daughters' gain, per cent	7.2	10.9

The daughters of these 250 proved bulls excelled their dams by 7.2 per cent in milk production and by 10.9 per cent in butterfat production. These gains are about twice as great as those shown in Table 1, though the dams had about equal production records in the two cases. The sire that can increase a record of 8,748 pounds of milk by 7.2 per cent and 353 pounds of butterfat by 10.9 per cent is bringing about rapid improvement in the herd. In both Tables 1 and 2 the dams had a high average production, which made it difficult to bring great gains through breeding.

The following question has been asked: "What improvement may be expected from mating cow-testing-association sires with the average dairy cows of this country?" The average butterfat production of the dairy cows of the United States is approximately 180 pounds. Sires that were mated with cows having a yearly butterfat production of between 150 and 199 pounds had daughters that greatly excelled their dams. Table 3 shows the results obtained from this comparison.

TABLE 3.—*Comparison of production records of average dams and their daughters*

Number of records	Average production	
	Milk	Butterfat
Daughters, 260	Pounds	Pounds
	7,607	300
Dams, 260		4,695
		179
Daughters' gain, pounds	2,912	121
Daughters' gain, per cent	62.0	67.6

The fact that purebred sires can raise the production of the average herd in one generation as much as 62 per cent in milk production and 67.6 per cent in butterfat production explains, in part, why our dairy herds are now improving.

Table 4 shows the results obtained when sires were mated with cows of different butterfat production.

TABLE 4.—*Results of mating sires with cows of different butterfat production*

Number of records	Butterfat production of dams	Gain or loss of daughters as compared with dams
	<i>Pounds</i>	<i>Per cent</i>
37	100	+136
157	150	+85
395	200	+50
675	250	+32
964	300	+18
986	350	+7
749	400	-3
569	450	-8
359	500	-13
171	550	-23
85	600	-26

According to these figures, the sires increased the butterfat production of the daughters of the lowest producing group 136 per cent and they lowered the butterfat production of the daughters of the highest producing group 26 per cent. The sires were able to increase the production of the daughters over the production of the dams until the production of the dams averaged almost 400 pounds.

If these sires lowered production when they were mated with cows having a butterfat production of 400 pounds or more, what sires are to be mated with such high-producing cows? Table 5 shows that there are sires that have been proved capable of increasing the production of the daughters over that of such dams.

TABLE 5.—*Results obtained from mating 200 proved sires with cows of different butterfat production*

Group No.	Number of sires	Range of butterfat production of dams	Number of sires that increased production of daughters	Number of sires that decreased production of daughters	Percentage of sires that increased production of daughters
		<i>Pounds</i>			
1	57	400 to 559-----	28	29	49
2	85	300 to 399-----	57	23	67
3	49	200 to 299-----	44	5	90
4	9	Under 200-----	9	0	100

Of these 200 proved sires, 57 were mated with cows whose average yearly butterfat production was 400 or more pounds. Twenty-eight, or approximately one-half of the 57 sires, were able to increase the production of the daughters of these high-producing cows.

In another study of the records of the 200 proved sires the records were divided into three groups according to the gain or loss in butterfat of the daughters as compared with the dams of the daughters. The results are shown in Table 6.

TABLE 6.—*Sires grouped according to gain or loss in butterfat of daughters as compared with dams of daughters*

Number of sires	Gain or loss in butterfat production	
	<i>Pounds</i>	<i>Per cent</i>
61	-219 to +2	-14.3
70	+3 to +158	+8.8
69	+60 to +324	+36.1

This table shows that about one-third of the 200 sires were unable to increase the butterfat production, that about one-third were able to increase production by a small margin, and that approximately one-third were able to increase production by a large margin. This does not mean that there were no good sires in the group that failed to raise production to a higher level. Some of the sires of this group failed because they were mated with high-producing cows, and some of the sires in the other groups succeeded in raising production because they were mated with low-producing cows. It may be said, however, that the dairy sires that failed were not good enough for the herds in which they were used.

One farmer had built up a high-producing dairy herd. After having done this, he began using a bull that was not from one of the dairy breeds. The average production of the seven dams whose records were reported was 415 pounds of butterfat. The average production of the daughters was 289 pounds. Every one of the seven daughters produced less than her dam. This was not a case of a bull in a china shop but of a bull that was not a dairy bull, yet was put at the head of a high-producing dairy herd.

In a dairy herd of 6 cows with a yearly average butterfat production of 489 pounds per cow a good dairy sire was used. In another herd of 10 cows with a yearly average butterfat production of 499 pounds per cow a poor dairy sire was used. The results are shown in Table 7.

TABLE 7.—*Comparisons of the results obtained from the use of a good and a poor dairy sire*

Sire A		Sire B	
Butterfat production by—		Butterfat production by—	
Dam	Daughter	Dam	Daughter
<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
553	655	536	311
402	719	430	258
372	897	416	201
373	645	567	322
616	461	567	264
616	674	426	218
		530	246
1 489	1 675	507	231
		507	347
		506	399
		1 499	1 280

<sup>1</sup> Average.

The dairy sires used in these two herds were purebreds of the same breed. One sire, however, in one generation raised the average production of the herd by 186 pounds, and the other lowered it by 219 pounds, though the dams in each case were about equal in average production of butterfat. There is a big difference even in dairy sires of the same breed.

In order to determine the results of mating the same sire with cows of different butterfat production, the records of the dams mated with each sire were arranged according to production of butterfat, begin-

ning with the lowest-producing dam. This was done for 100 proved sires. Table 8 shows the average gain or loss of the daughters as compared with the dams.

TABLE 8.—*Comparison of the records of the daughters of 100 proved sires with the records of their dams*

Group No.	Average butterfat production of the dams	Average butterfat production of the daughters	Average gain or loss of the daughters as compared with the dams
1	<i>Pounds</i> 268	<i>Pounds</i> 383	<i>Pounds</i> +115
2	301	375	+74
3	329	380	+51
4	362	389	+27
5	393	397	+4
6	434	401	-33

The 100 sires when mated with the lowest-producing dams increased the average butterfat production of the daughters over the dams by 115 pounds. When mated with the next to the lowest producing dams, they increased the average butterfat production of the daughters over the dams by 74 pounds. The results for the other four groups were as follows: The daughters of the dams of Group 3 excelled the dams by 51 pounds of butterfat; the daughters of the dams of Group 4 excelled the dams by 27 pounds of butterfat; the daughters of Group 5 excelled the dams by 4 pounds; and the daughters of the dams of the sixth and highest-producing group averaged 33 pounds less than their dams.

#### SOME REASONS WHY BULLS ARE SENT TO THE BUTCHER BEFORE THEIR VALUE HAS BEEN DETERMINED THROUGH THE RECORDS OF THEIR DAUGHTERS

A large percentage of dairy bulls are sent to the butcher before they have been proved through a comparison of the records of the daughters with the records of their dams. The following are some of the reasons given by the owners of dairy bulls for sending them to the butcher:

The bull was sold for beef. If we had been in a testing association at that time this bull might still be alive.

We disposed of the bull because he was homely.

The bull was sent to the block because his calves were nearly all bulls.

The bull accidentally killed his keeper and was then sold for beef.

The bull was sent to the butcher because his daughters were not typy. The records have now shown that he was an excellent bull.

I have often regretted that this bull was sold for beef, as the records now show that he was an outstanding bull.

#### ECONOMY IN THE USE OF FEED BY HIGH-PRODUCING COWS

The purpose of using good purebred dairy sires is to increase production of milk and butterfat per cow. The purpose of using good proved sires is to insure a rapid increase in production of milk and butterfat per cow. The chief purpose of increasing the production

per cow is to increase profits per cow and per herd. A tabulation of more than 100,000 yearly individual cow records showed the following relation between production and income over cost of feed:

TABLE 9.—*Relation between production of butterfat and income over cost of feed*

Number of records	Production of butterfat	Cost of feed	Income over cost of feed
<i>Pounds</i>			
182	56	\$38	-\$5
1,123	107	45	14
5,519	155	50	34
15,107	203	55	54
23,847	251	61	75
23,876	299	68	96
16,663	347	75	116
8,817	397	82	138
3,674	446	90	158
1,413	496	100	178
507	545	111	204
182	596	122	223

These records were selected in such a way that there was a difference of approximately 50 pounds of butterfat between group centers. As production increased from group to group there was a gain of about \$20 in income over cost of feed for each gain of 50 pounds of butterfat. In the group having an average butterfat production of 107 pounds the income above feed cost was \$14. In the group having an average butterfat production of 397 pounds the income over cost of feed was \$138. This shows that between these limits, as production of butterfat increased less than threefold, the income over cost of feed increased approximately ninefold.

High-producing cows are economical in the use of feed. A tabulation of more than 100,000 individual-cow records showed that the cost of feed for cows producing 9,000 pounds of milk a year per cow was only about 40 per cent more than for cows producing 4,500 pounds. Another tabulation of approximately 10,000 individual-cow records showed that cows producing 9,000 pounds of milk per cow ate only about 40 per cent more digestible nutrients than cows that produced half as much.

Therefore, to increase income over cost of feed per cow and to bring about the most economical use of feed, high-producing cows are necessary. To obtain high-producing cows it is necessary to use good sires. To be certain that the sires are capable of transmitting high production to their offspring proved dairy sires should be used.

#### SUMMARY AND CONCLUSIONS

The daughters of average sires, in cow-testing associations produced 18 pounds, or 5.1 per cent, more butterfat than the dams of the daughters; the daughters of average proved sires produced 38 pounds, or 10.9 per cent, more butterfat than their dams; and the daughters of average sires and average cows produced 121 pounds, or 67.6 per cent, more than their dams.

Only good proved dairy sires can be relied on to increase the production of the daughters over that of dams having a yearly production of 400 pounds of butterfat.

Good proved dairy sires should double the production of the average dairy herd in two or three generations. A tabulation of 100,000 yearly individual-cow records has shown that cows that produce twice as much as the average cows of this country require only about 40 per cent more feed.

When you buy a bull on the basis of pedigree he may not disappoint you. When you buy a bull on the basis of performance he will not disappoint you. There is no better way to improve a dairy herd through breeding than by using good, proved, purebred dairy sires.

By means of cow-testing-association records, 270 dairy sires have been proved. This is only a beginning. The time may come when good, proved, purebred dairy sires may be so numerous that they will be available for use in every dairy herd.

ORGANIZATION OF THE  
UNITED STATES DEPARTMENT OF AGRICULTURE

August 3, 1927

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